



1013503

SOLUTIA - 101



February 21, 2003

Mr. Kenneth S. Bardo
RCRA Division
Corrective Action Section
U.S. Environmental Protection Agency, Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604

Subject: Solutia Inc., W.G. Krummrich Plant (ILD000802702)
RCRA Corrective Measures Study
Soil Sampling Map

Dear Mr. Bardo:

On behalf of Solutia, URS Corporation is pleased to submit the attached soil sampling location plan for the Corrective Measures Study (CMS) at the W.G. Krummrich Plant. We look forward to meeting with you on February 27th and discussing the plan. In the meantime, if you have any questions or comments, please call Richard Williams at the Krummrich Plant at (618) 482-6340.

Sincerely,

Robert B. Billman
Senior Project Manager

Enclosure (Figure 1 – Soil Boring Location Map, 3 copies)

Cc: Richard Williams, Solutia (3 copies)
Bruce Yare, Solutia (2 copies)
John Belin, Booze Allen Hamilton
Nabil Fayoumi, USEPA CERCLA
Jim Moore, IEPA Springfield
Gina Search, IEPA Collinsville
Linda Tape, Husch & Eppenberger
Lisa Bradley, ENSR
Gale Hoffnagle, TRC

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Solutia Inc.

W.G. Krummrich Plant
500 Monsanto Avenue
Sauget, Illinois 62206-1198
Tel 618-271-5835

February 25, 2003

Mr. Ken Bardo
RCRA Division
U. S. Environmental Protection Agency, Region 5
77 West Jackson Blvd.
Chicago, IL 60604

**Re: Air Sampling and Analysis Plans
Solutia W. G. Krummrich Plant, Sauget, Illinois**

Dear Mr. Bardo:

In a letter dated February 4, 2003, Solutia proposed to obtain indoor air samples in the enclosed portions of buildings without a forced air ventilation system as part of the proposed air quality sampling program for the CA 725 Environmental Indicator demonstration. In a subsequent telephone conversation, you requested that we provide some information on the methodology and analyte list to be used for these samples. This letter responds to that request and serves as an addendum to our "RCRA CA-725 Environmental Indicators – Human Exposures Air Quality Field Sampling Plan", submitted to you on December 12, 2002.

In order to amend the referenced sampling plan to include the proposed indoor air samples, it will be revised as follows:

- In Section 1.0, Introduction – Add the phrase "and plant building indoor air quality sampling" at the end of the second paragraph, following the word "sampling".
- In Section 2.0, Project Scope and Objectives – At the end of this section add the following new paragraph.- "TRC will conduct indoor air sampling in those buildings where employees work, and where there is no positive pressure air handling system and there are enclosed spaces. This sampling will be accompanied by Heating, Ventilation, and Cooling (HVAC) data and individual hygiene sampling records, where available".
- In Section 3.0, subsection 3.6, Building Evaluation – Replace this section with the following:

3.6 Indoor Air Quality Samples

Two rounds of indoor air sampling will occur, one in the winter (in March) and the second in the early part of the summer (in June) in order to define any differences which occur with varying ambient temperatures and, to a lesser extent, differences in water vapor content. The sampling program will be based on the following rationale:

3.6.1 Rationale

There are two potential sources that may contribute constituents to indoor air and which must be evaluated. Current emissions of some of these compounds, although controlled to Maximum Achievable Control Technology under the Clean Air Act, do occur and will contribute to outdoor and, potentially, indoor concentrations and exposure. The second potential source is the impacted groundwater beneath the plant and, especially, the shallow hydrogeologic unit. Indoors, the primary route for exposure from the unit is vapor intrusion from the ground directly into the buildings. While outdoor air may contain low concentrations of some of the constituents of concern, potential outdoor worker exposure is determined by a variety of factors, including by wind speed, wind direction, atmospheric stability, etc. When workers are indoors, their exposure is determined by a more stable concentration that can be more easily measured and represents a better evaluation of long-term exposure. Thus, this sampling program will seek to measure concentrations in the buildings that may be subject to vapor intrusion.

The sampling will be limited to the buildings in which employees have assigned work areas or offices (enclosed spaces) and are not equipped with a forced ventilation system. These buildings are identified as BK, BBG, BBZ, and CCB on Figure 2 of the Field Sampling Plan (FSP). The buildings marked in blue are those with employees assigned. In addition to the air sampling, the character of these buildings will be evaluated for vapor intrusion. If the building is built on a slab, the integration of the slab to the walls will be evaluated. The only building with a basement is the BK building, the main office building. The character of the basement flooring and sidewalls will also be evaluated.

Sampling will be performed at an interior location that represents generalized exposure to the workers in the enclosed spaces of that building or, in the case of BK, in the basement. A time averaged sample will be collected, representative of worker exposure. Each of these five buildings is open on a 24-hour a day basis, but they all have the highest occupancy rate during the day shift. Thus, eight-hour time averaged samples will be taken during the day shift. Sample locations will be indicative of breathing heights in the spaces selected. In the BK building, samples will be collected in the basement at a location where workers are assigned.

Sampling will use SUMMA canisters evacuated by the laboratory and prepared appropriately for TO-15 sampling. Filling of the canister will be made by valve so that an approximate 8-hour sampling time will be attained. Because of the possible

February 25, 2003

presence of some of these compounds in the outdoor air, the building or office intake to the HVAC system will be sampled simultaneously on the same schedule as the indoor samples. In this way, the two sources of potential indoor concentrations can be separated.

Sampling in each building will be accomplished with the TO-15 method. As with the soil vapor sampling, the analytes are shown in Table 1 (revised for TO-15 analysis). A copy of the revised table is attached. Appendices B and C of the FSP present the standard operating procedures for collection of air samples into evacuated canisters.

We look forward to receiving your comments on the sampling plan and on this letter. If you have any questions, please call me at (618) 482-6340.

Sincerely,
Solutia Inc.



Richard S. Williams
Sauget Sites Project Manager

cc: Linda Tape, Husch & Eppenberger
John Belin, Booz Allen & Hamilton
Robert Hiller, Solutia
Bruce Yare, Solutia
Gale Hoffnagle, TRC Environmental Corporation.

TABLE 1: Compounds to be Sampled
(major compounds found in shallow hydrogeologic unit)

Volatiles	Method TO-15 (EPA Listed Compounds)	Project Reporting Limit (ppbv)
Primary		
Benzene	X	0.34
Chlorobenzene	X	0.34
Ethylbenzene	X	0.27
Toluene	X	0.99
M&P-Xylene/O-Xylene	X	0.76
Secondary		
Chloromethane	X	0.40
1,2-Dichloroethane	X	0.24
1,2,4-Trichlorobenzene	X	--
1,1,1-Trichloroethane	X	0.62
Acetone	X	--
MEK	X	--
MIBK	X	--
Semi-Volatiles		
Primary		
0-Cresol	X	--
Aniline	X	--
Chloroaniline	X	--
Phenol	X	--
Chlorophenol	X	--
Dichlorophenol	X	--
Nitrochlorobenzene	X	--
Secondary		
1,2-Dichlorobenzene	X	0.44
1,3-Dichlorobenzene	X	0.36
1,4-Dichlorobenzene	X	0.70
Trichlorophenol	X	--
Nitrobenzene	X	--
Trichlorophenol	X	--
Pentachlorophenol	X	--

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February 28, 2003

Discussions from February 27, 2003 Meeting with Solutia

The purpose of the meeting was to discuss the Soil Boring Location Map dated February 21, 2003 for the Corrective Measures Study at the Solutia W.G. Krummrich Plant. Modifications had been made to the Soil Sampling Plan to address EPA comments provided in writing and e-mail. Solutia was represented by Richard Williams, Bob Hiller and Bob Billiam (URS). EPA was represented by Ken Bardo.

The new soil sampling plan uses some grid sampling with soil sampling also biased toward SWMUs and AOCs. It is important to note that this is only the first phase of sampling, with additional sampling to be performed in June or July of 2003 based on the Phase I results. The two areas depicted on the map with significant shallow groundwater contamination are known to be heavily impacted from releases and will be studied further during the second phase of soil sampling.

Solutia is also compiling historical data to supplement the proposed sampling. Numerous borings associated with closure and excavations have been performed in the past. The usability of the historical data will be evaluated and the data will be used in the CMS as appropriate.

Two rigs will mobilize on-site on March 10, 2003. Sampling is expected to take two weeks. Sampling for VOCs will likely use the EnCore sampling method. The air sampling program is also expected to begin during soil sampling. EPA will provide comments on Solutia's air sampling plan modifications dated February 25, 2003, during a meeting scheduled in Chicago for March 13, 2003. Air sampling would then likely start on March 17, 2003. Field work will be performed Monday through Friday, from approximately 8 AM to dusk.

EPA will provide oversight during the Phase I sampling program. Solutia, EPA, and their contractors should work together to ensure that the sampling procedures are appropriate and agreed to. Any outstanding differences need to be corrected prior to the Phase II sampling program.

During the February 27, 2003 meeting, EPA requested and Solutia agreed to the following modifications to the proposed soil sampling plan:

- Extend Investigation Area 3, Pipeline Corridor to the levee, where the old benzene pipeline meets the new benzene pipeline. Will either conduct soil sampling for VOCs or perform soil vapor analysis and then conduct soil sampling, if necessary.
- Add biased soil samples to Investigation Area 2, Lot F (Southern Third) to investigate trenches identified in aerial photographs as 77EX1F and a surface impoundment identified as 60 SI1F. Also perform tighter grid sampling throughout the area to provide adequate coverage of this historically disturbed area. There appears to be some confusion regarding SWMU 27 (Route 3 Drum Site) and whether barrels are buried there. Solutia will

research its history and EPA will contact IEPA to get their files. The rationale for the soil sampling program will then be determined based on the records found.

- Obtain both surface and subsurface samples at Lot F since soil is present at the surface (Note: This should also be done for any sampling in the vicinity of the Solutia Sign which is a small landscaped area). For Phase I, Solutia proposes only one sample be obtained from each boring based on visual observation and/or PID reading. The supporting rationale for only one sample is that all surface soils at the facility, except for Lot F (and the Solutia Sign area) are covered with asphalt, concrete, or gravel and incidental contact is unlikely. Solutia has completed its surface cover investigation and determined gravel thickness, which varies from 1-2 inches to >24 inches. Solutia will provide and support a minimum gravel thickness (e.g., 12 inches) necessary to minimize incidental contact. Additional gravel would then be applied to the facility surface to meet this approved thickness.
- Buried drums containing chlorophenol wastes were removed along the roadway and near SWMU 53 during sewer construction in 1982. EPA wants assurances that all drums and contaminated soil are removed from this area. Additional sampling and/or geophysical work must be performed in this area. Solutia will research any historical records it has on this removal project to assist in directing upcoming investigations.
- For Investigation Area 10, Former Chlor-Alkali Area, the complete suite of parameters (VOCs, SVOCs, PCBs, Metals) will be added to mercury.
- Dioxin/furan sampling will be performed during Phase II in areas with chlorophenol contamination and in areas of former chlorophenol production.
- All pits and sumps at the plant will be identified and located. Integrity testing and/or sampling will be performed at each pit/sump to ensure they are not current sources of groundwater contamination.
- Solutia will use approved background samples from the CERCLA investigations for the RCRA corrective action. No new background sample locations are proposed.
- Investigation is not proposed at SWMU 32 and the Former PCB Warehouse because the area was investigated during closure. Data from the closure plan report will be provided.

Outstanding issue: No pesticide/herbicide analysis is proposed. EPA previously commented that historical records for pesticide and herbicide production/storage should be evaluated to delineate potentially contaminated areas. Groundwater data could also be used to delineate potentially contaminated areas. EPA requested that disposal areas, such as the southern third of Lot F, have soils analyzed for pesticides/herbicides. If necessary, pesticide/herbicide analysis can be performed during Phase II, similar to dioxin/furans.

SOLUTIA - 104

March 13, 2003

EPA Comments on Solutia's Revisions to the Air Quality Field Sampling Plan Dated February 25, 2003

In general, the indoor air sampling approach proposed in the revisions to the Air Quality Field Sampling Plan is consistent with the approach discussed on several previous occasions with Solutia. However, there are a few concerns and issues that need to be addressed. These concerns and issues are discussed in the following bullets:

- The first paragraph on the second page (Section 3.6) indicates that two rounds of indoor air sampling will occur; however, no discussion of the number of samples or the sampling locations (beyond the specific buildings that will be sampled) is provided. It should be noted that concentration gradients or hot spots can occur within and between buildings depending on various factors such as layout, air flow patterns, and occupancy. Therefore, it is generally desirable to collect multiple samples at each location. Solutia should provide additional discussion of the number of samples and the sampling locations involved in the indoor air sampling.
- The third paragraph on the second page (Section 3.6.1) indicates that buildings BK, BBG, BBZ, and CCB are not equipped with forced air ventilation systems. As a result, Solutia states that indoor air sampling will be conducted in these buildings. This paragraph also indicates that "the character of these buildings will be evaluated for vapor intrusion." It is unclear how the information and data obtained during characterization of these buildings will be used in the evaluation of indoor air concentrations. Solutia should provide a discussion of the intent of the building characterization and outline how any information obtained during the characterization will be used in the evaluation of risks and hazard associated with exposure to indoor air concentrations.
- The fourth paragraph on the second page (Section 3.6.1) indicates that "each of the five buildings is open. . . ." The third paragraph indicates that four buildings (BK, BBG, BBZ, and CCB) will be sampled. Solutia should clarify whether it is four or five buildings that will be sampled. If a fifth building will be sampled, Solutia should identify the building.
- The last paragraph on the second page (Section 3.6.1) indicates that "filling of the canister will be made by valve so that an approximate 8-hour sampling time will be attained." It is recommended that indoor air samples be collected over a minimum of an 8-hour period. Therefore, the valve should be set to an evacuation rate that will ensure samples are collected over an 8-hour period. To ensure a conservative evaluation of exposure, Solutia should err toward longer sampling times to ensure that a minimum of an 8-hour period is sampled.

• The second paragraph on the third page (Section 3.6.1) indicates that samples will be analyzed using the TO-15 method. No additional discussion of the site preparation, sample collection, or quality assurance/quality control (QA/QC) procedures is provided. Each of these three factors can significantly impact the quality and usability of the data obtained from indoor air sampling. For example, EPA's Subsurface Vapor Intrusion Guidance recommends that, prior to sampling, a site preparation survey be conducted. As part of the site preparation activities, it is recommended that the sampling location be closed (windows and doors shut) and the use of potential sources of emissions such as cleaning products and tobacco smoke should be eliminated 12 to 24 hours before sampling begins. In addition, sample activities should include an appropriate number of blank and duplicate samples to meet QA/QC standards. EPA's Subsurface Vapor Intrusion Guidance provides additional information and several references, which outline methods for conducting a site preparation survey, standard operating procedures for collecting indoor air samples, and adequate QA/C procedures. Finally, Solutia should ensure that the sampling procedures that are followed are consistent with EPA approved methods and a detailed discussion of any deviations should be included in a report addressing indoor air sampling results.

It is recommended that Solutia use EPA's Subsurface Vapor Intrusion Guidance as a guide for the proposed indoor air sampling activities. In addition, we recommend that Solutia complete the Tier 1, Tier 2, and, if necessary, Tier 3 screening checklists included in EPA's Subsurface Vapor Intrusion Guidance after indoor air samples have been collected. These checklists involve an evaluation of soil, groundwater, soil vapor, and indoor air contaminant concentrations and allow for a tiered approach to evaluating risks. Results from these checklists can be used to support conclusions regarding the potential impact of the vapor intrusion to the indoor air pathway and to make CA-725, Current Human Exposures Under Control Environmental Indicator determinations regarding the air exposure pathway.

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Solutia Inc.
W.G. Krummrich Plant
500 Monsanto Avenue
Sauget, Illinois 62206-1198
Tel 618-271-5835

April 23, 2003

Mr. Ken Bardo
U. S. Environmental Protection Agency Region V DE-9J
RCRA Division
77 West Jackson Blvd.
Chicago, Illinois 60604

**Re: Revised Corrective Action Cost Estimates
Solutia W. G. Krummrich Plant
Sauget, Illinois**

Dear Mr. Bardo:

In accordance with the requirements of Section XVI of the Administrative Order on Consent (AOC) entered into by Solutia Inc. (EPA Docket No. R 8H-5-00-003), and in response to your letter of February 4, 2003, we are pleased to submit the attached revised cost estimate for the corrective actions to be undertaken at the Solutia W. G. Krummrich facility in Sauget, Illinois. The costs included in this estimate will cover our activities through June 1, 2004, when we will submit the "Final Corrective Measures Proposal" required by section VI (5) of the AOC. Specifically, the following activities are included:

- Soil sampling specified in the Work Plan submitted to EPA on November 25, 2002 and subsequently revised during a meeting on February 27, 2003 (Phase I investigation).
- Air sampling specified in a Work Plan submitted to EPA on December 12, 2002 and revised on February 25, 2003 and March 28, 2003.
- Additional soil samples as determined by the results of the Phase I investigation.
- Human health risk assessments.
- Implementation of physical and institutional barriers required to control human exposure at the facility.
- Preparation of environmental indicator reports.
- Preparation of the Final Corrective Measures Proposal.

Consistent with your instructions, the cost estimate does not include any provision for implementation of any final corrective measures at the site. However, it is possible that some of the physical and institutional measures that will be put in place to control human exposures could become part of the Final Corrective Measures Proposal. That possibility will be evaluated during preparation of the proposal.

Mr. Ken Bardo

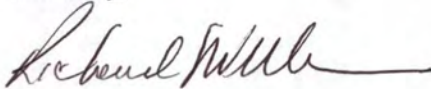
U. S. Environmental Protection Agency


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April 23, 2003

We look forward to receiving your comments on the attached cost estimate. If you have any questions regarding the estimate, please give me a call at (618) 482-6362, or Richard Williams at (618) 482-6340.

Sincerely,



 Robert J. Hiller
Project Manager
Solutia Inc. – W.G. Krummrich Plant

cc: Jim Moore, IEPA
Gina Search, IEPA
Linda Tape, Husch & Eppenberger
Richard Williams, Solutia
Gary Vandiver, Solutia

**SOLUTIA INC.
W. G. KRUMMRICH PLANT
RCRA CORRECTIVE ACTION FINANCIAL ASSURANCE COSTS**

1. CORRECTIVE MEASURES STUDY (CMS)

Phase I CMS

Summary of Work

- Approximately 106 soil borings to 15 ft or to groundwater
- For main plant area, one analytical sample per boring from most impacted interval (based on field observations). Two samples per boring from Lot F area. Estimate 156 samples including QA/QC samples. Most samples analyzed for VOCs, SVOCs, and metals.
- Field screening for PCBs via immunoassay. Confirmatory analyses for samples with screening results >25 mg/kg, and 10% of samples <25 mg/kg.
- Surface geophysics to assess potential presence of drums at Rt. 3 drum site.
- Data review and validation per QAPP.
- Phase I Report primarily a data transmittal, along with rationale for screening out SWMUs/AOCs from further assessment, or approach and rationale for Phase II work.

Estimated Costs

Work Item	Estimated Cost
Project Planning	\$ 25,000
Field Investigation	
• Labor	\$90,000
• Equipment/Expenses	\$28,000
• Drilling Contractor	\$30,000
• Geophysical Contractor	\$15,000
• Laboratory Services	\$98,000
• IDW Disposal	\$5,000
Data Management, Validation and Evaluations	\$47,000
Reporting	\$27,000
Management	\$28,000
Total, Phase I CMS	\$393,000

Phase II CMS

Summary of Work

- Approximately 33 of the Phase I borings appeared to be impacted based on a limited review of boring logs and field screening data. Assume that one boring will be

advanced at each of these locations, and two soil samples will be analyzed from each boring for combinations of VOCs, SVOCs, PCBs, metals and leaching (SPLP) parameters.

- Collect soil samples from 10 additional locations in Investigation Areas 6 (Big Mo area) and 12 (chlorobenzene production area) which were deferred to Phase II (two samples per boring, analysis for VOCs, SVOCs, PCBs, metals).
- Collect 10 samples from above borings for dioxin/furan analyses.
- Data review and validation per QAPP.
- Conduct human health risk assessment.
- Phase II findings presented in CMS Report.

Estimated Costs

The Phase II costs have been developed in part by prorating the Phase I costs for the number of borings/samples.

Work Item	Estimated Cost
Phase II Scoping and Project Planning	\$20,000
Field Investigation	
• Labor /Expenses/ Contractors	\$104,000
• Laboratory Services	\$88,000
Data Management, Validation and Evaluations	\$34,000
Human Health Risk Assessment	\$150,000
CMS Reporting	\$50,000
Management	\$20,000
Total, Phase II CMS	\$466,000

2. ENVIRONMENTAL INDICATORS

2A. CA-725 Human Exposures Under Control

Work Item	Estimated Cost
Soil Vapor and Indoor Air Sampling	\$100,000
Human Health Risk Assessment	\$50,000
Gravel Delineation Survey	\$18,000
Evaluations and Reporting	\$25,000
Additional Gravel Cover	\$50,000
Institutional Controls	\$15,000
Total, CA-725	\$258,000

3. **SUMMARY OF RCRA CORRECTIVE ACTION COSTS**

Work Item	Estimated Cost
Phase I CMS	\$393,000
Phase II CMS	\$466,000
CA-725 Environmental Indicator	\$258,000
Total	\$1,117,000

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Kenneth
Bardo/R5/USEPA/US
04/28/2003 10:20 AM

To rswill1@solutia.com, rjhill1@solutia.com
cc
bcc

Subject Follow-up

Richard - I looked at the DOCC after our phone conversation this morning. Figure 18 of the DOCC proposed three north-south transects for sampling and two north-south transects for water levels. The specific groundwater sampling plan is described in Section 6.3 of the DOCC. EPA had no specific comments on this section of the DOCC.

However, attached are previous analyses of Solutia's historical groundwater reports. Any questions, give me a call. - Ken



Solutia GW Review.wpr



Solutia GW vs. MCLs.wp

**SOURCE: 1998 EVALUATION OF GROUND-WATER QUALITY CONDITIONS AT
THE W.G. KRUMMRICH PLANT**

The following table evaluates data from groundwater samples obtained in September 1998, at the Solutia, Inc. facility located in Sauget, Illinois that were analyzed for VOC's and SVOC's. The groundwater data was compared to Region 5 risk-based screening levels (RBSL's), consisting of either the maximum contaminant level (MCL) or preliminary remediation goal (PRG) for constituents without an MCL. Nine (9) hazardous constituents were found to exceed their RBSL in at least one groundwater sample. The most prevalent hazardous constituents found to exceed their RBSL in groundwater at the Solutia, Inc. facility were benzene, bis(2-ethylhexyl) phthalate, chlorobenzene, and 2-chlorophenol. The majority of hazardous constituents exceeding their RBSL were found in groundwater from monitoring wells screened at an intermediate depth of 60' - 80', followed by deep wells screened at 85' - 105', and then shallow water table wells.

Hazardous Constituent	MCL orl PRG in µg/l ¹	Number of Samples Exceeding MCL or PRG ²	Percent of Samples Exceeding PRG
VOC's: Benzene	5	16	53%
Chlorobenzene	39*	21	70%
Chloroform	0.16*	2	7%
1,1-dichloroethene	7	1	3%
trans-1,2-dichloroethene	100	1	3%
Vinyl chloride	2	1	3%
SVOC's: bis(2-ethylhexyl) phthalate	4.8*	6	29%
2-chlorophenol	38*	4	19%
1,4-dichlorobenzene	75	1	5%

¹ For constituents without an MCL, the PRG was used and is highlighted by a *.

² A total of 30 groundwater samples were obtained at the Solutia, Inc. facility (excluding a duplicate) from shallow, intermediate, and deep monitoring wells. All were analyzed for VOC's but only 21 samples were analyzed for SVOC's.

EPA OBSERVATIONS ON SOLUTIA, INC. 1997 AND 1998 GROUND-WATER REPORTS AND PRELIMINARY CONCLUSIONS

- Table 2 of the *1998 Evaluation of Ground-Water Quality Conditions* report shows that insufficient purging was performed at wells GM-4C, GM-6B, GM-9C, GM-10B, GM-10C, GM-12B, GM-17B, GM-20B, MW-3B, MW-5C, MW-7B, and MW-7C. At all these wells, except for MW-3B, the volume of water purged prior to sampling was substantially less than one (1) well volume. Improper well evacuation may result in the analysis of stagnant water that is not representative of in-situ ground-water quality.
- In addition to insufficient purging described above, off-site monitoring well GM-20B is not properly located to adequately monitor the groundwater contaminant plume emanating from the Solutia, Inc. facility. The potentiometric surface map for the Intermediate Zone (Figure 3) shows a WNW groundwater flow and when compared to the potentiometric surface map for the Deep Zone (Figure 4), a slight downward vertical component of groundwater flow is also apparent at the Solutia, Inc. facility. The potentiometric surface and benzene/chlorobenzene concentration maps suggest that the core of the groundwater dissolved contaminant plume would be migrating north of well GM-20B, and also be sinking with distance from the on-site source(s). Off-site Intermediate and Deep Zone monitoring wells would need to be located north of GM-20B and between well nests MW-3 and MW-5.
- The groundwater dissolved contaminant plume, as identified by the high concentration of benzene and chlorobenzene exceeding their respective Federal groundwater protection standards (5 and 39 µg/l) at wells MW-3B, MW-3C, MW-5B, and MW-5C, would be expected to have already migrated off-site. Based on the potentiometric surface maps, the identified concentrations, and the estimated ground-water velocity, the plume probably discharges to the Mississippi River in the vicinity of Site R and the "Six-Pack" power plant. The absence of a near-surface finer-grained layer in the western portion of the Solutia, Inc. facility (see Figure 3, *Summary of Ground-Water Quality Conditions*, Volume I of II, 1997) could also allow for a deeper dispersion of dissolved contaminants. The historical wells noted in this area (see Figure 2, *Summary of Ground-Water Quality Conditions*, Volume I of II, 1997) are U.S. Corps of Engineers observation and dewatering wells, monitoring wells for dewatering projects, D'Appolonia monitoring well clusters, D'Appolonia rock wells, Law Engineering monitoring wells, and Geraghty & Miller monitoring wells.
- Mid-1980's groundwater data from Intermediate and Deep wells GM-27B and GM-27C, located in the northwest corner of Site R adjacent to the Mississippi River, do show significant concentrations of benzene and chlorobenzene which may be indicative of the contaminant plume found at the manufacturing portion of the facility. Nearby dewatering wells (screened depth unknown) DW-18, DW-29, and DW-30 also produced groundwater with significant concentrations of benzene and/or chlorobenzene. Groundwater from

wells GM-27B and GM-27C was also found to contain 2-chlorophenol, 4-chlorophenol, phenol, bis(2-ethylhexyl)phthalate, 1,2-dichlorobenzene, and 1,4-dichlorobenzene, which are hazardous constituents also found in the groundwater contaminant plume at the manufacturing portion of the facility. Some of these compounds (dichlorobenzenes) were also found at DW-18 and DW-30.

- Suggested work to further clarify groundwater quality and conditions at the Solutia, Inc. facility is: 1) checking for NAPL prior to purging, given the high concentrations of relatively insoluble organic compounds; and 2) updating groundwater velocities which were last determined using 1984 data.
- Work necessary to determine if the migration of contaminated groundwater is under control: 1) definition of groundwater quality before discharge to the Mississippi River (i.e., extent of the plume, which requires additional monitoring wells); and 2) surface water and sediment sampling, including an ecological assessment, in the Mississippi River at the point where the contaminant plume discharges. Ideally, work in the river should be performed now under current low flow conditions.
- Interim stabilization measures to address groundwater contaminant plume: 1) source controls, including completion of the sewer re-lining project, addressing contaminated fill and soils (as evident in the 1998 Closure Plan Status Report) at the manufacturing facility utilizing passive and/or active technologies, and NAPL recovery, if necessary; and 2) installation and operation of a containment system and technology that will allow water within the plume to be contained and treated at the facility or before discharging to surface water.

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May 1, 2003
B-09075-0143-0502
REPA3-0502-074

Bernie Orenstein
Regional Project Officer
U.S. EPA Region 5 (DM-7J)
77 West Jackson Boulevard
Chicago, IL 60604

Subject: EPA Contract No. 68-W-02-018, Work Assignment R05802, Corrective Action Support Task 4. TDM No. 13. Field Oversight Report for the Phase I Corrective Measures Study Site Investigation Activities–Soil Sampling, Solutia W.G. Krummrich Facility, Sauget, Illinois.

Dear Mr. Orenstein:

In response to Work Assignment R05802, Task 04, under EPA Contract No. 68-W-02-018, Booz Allen Hamilton (Booz Allen) is transmitting the attached Field Oversight Report for the Phase I Corrective Measures Study Site Investigation Activities–Soil Sampling, for the Solutia W.G. Krummrich facility, in Sauget, Illinois. Based on direction received from the EPA Work Assignment Manager, Mr. Kenneth Bardo, Booz Allen is submitting separate field oversight reports for the soil sampling and indoor air sampling activities. The field oversight report for the air sampling activities was submitted on March 25, 2003. This report is the final submission for work related to the oversight activities conducted in March 2003.

The deliverable consists of the oversight report, field notes and photographs. Generally, Solutia's consultants followed the procedures outlined in the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) dated November 2002. However, there were two deviations from the QAPP and FSP. These deviations related to the collection of samples for volatile analyses and the use of decontamination water rather than clean water for hydrating the granular bentonite pellets. This pellet hydration deviation was corrected in the field. According to the facility, the use of disposable syringes rather than the Encore sampling device was approved by EPA. Other than these two deviations, the facility's consultant appeared to follow the QAPP and FSP.

If you have any questions regarding this deliverable, please contact me at (254) 793-3419.

Sincerely,

Kathy Thompson
BOOZ ALLEN HAMILTON (For)

Phoebe Davol
Work Assignment Manager

Enclosure

cc: Alan Wojtas, Work Assignment Manager
Kenneth Bardo, Technical Advisor
Gloria Kane, Contracting Officer (cover letter only)
Jody Gosnell, Contract Specialist (cover letter only)
BAH EPMT QA/QC Coordinator

**FIELD OVERSIGHT REPORT FOR THE CORRECTIVE MEASURES STUDY (CMS)
SITE INVESTIGATION ACTIVITIES – SOIL SAMPLING**

**SOLUTIA, INC., W.G. KRUMMRICH PLANT
SAUGET, ILLINOIS**

REPA3-0502-074

May 1, 2003

The U.S. Environmental Protection Agency (EPA) Region 5 requested Booz Allen Hamilton (Booz Allen) to conduct field oversight, under the Resource Conservation and Recovery Act (RCRA) Enforcement, Permitting and Assistance (REPA) Contract No. 68-W-02-018, at Solutia, Inc.'s W.G. Krummrich Plant (Facility) in Sauget, Illinois. Solutia is conducting field sampling to facilitate the completion of the RCRA Current Human Exposure Environmental Indicators (EI) Report (CA-725). The field work was conducted according to Solutia's Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) dated November 2002. The field work conducted during the weeks of March 11 and March 17, 2003, was performed in Investigation Areas 1, 2, 3, 4, and 11 according to the Soil Boring Location Map dated February 21, 2003, provided by Solutia. This deliverable consists of a copy of the logbooks maintained by the Booz Allen staff on site as well as a copy of photographs with descriptions.

March 11, 2003

On Tuesday, March 11, 2003, at approximately 0805 hours, Booz Allen team member David Twigg arrived at the Facility. The temperature was approximately 50 degrees (°) Fahrenheit (F) and cloudy. Mr. Twigg, after viewing a brief safety video, met with Mr. Bob Hiller of Solutia and Mr. Steve Bunsen of URS (Solutia's contractor). Mr. Hiller and Mr. Bunsen then provided the operational and environmental history of the Facility and surrounding properties, reiterated the information covered in the safety video, and explained the planned field activities for the remainder of the week. The investigation would begin in Areas 1, 2, and 3 (Lot F) and then move to Areas 4 and 11. Mr. Hiller also indicated that the investigation into Area 10 would likely change pending legal discussions with Gateway Energy which currently leases that portion of the Facility from Solutia.

At approximately 1000 hours, Mr. Twigg accompanied Mr. Hiller and Mr. Bunsen over to Lot F where Mr. Hiller pointed out the areas proposed for sampling. At approximately 1030 hours, the field sampling crew arrived to set up at the first sampling location and Mr. Hiller conducted a safety meeting attended by Mr. Twigg; Mr. Steven Bunsen, Mr. George Jones, and Ms. Jennifer Schwent, URS; and Mr. Jim Rowden and Mr. Brian Schilling, Roberts Environmental (URS' subcontractor).

Upon completion of the safety meeting (approximately 1100 hours), the field crew set up and commenced probing at location S0101. Roberts Environmental used a GeoProbe® GH-40 attached to a Bobcat® 753 uniload. The field crew sampled continuously using probe rods (4 feet long with an outside diameter of 2 inches) and MacroCore® lined with disposable acetate

liners to a depth of 16 feet below ground surface (bgs). Mr. Bunsen indicated that this varied from the QAPP because the Roberts Environmental was using four 4 foot probe rods instead of five 3 foot probe rods. URS personnel logged the boring and screened for volatile organic compounds (VOCs) every few inches with a MiniRae® photoionization detector (PID). No evidence of contamination was noted so samples were collected from zero to two feet bgs (S0101 0 - 2' @ 1148) and 14 to 16 feet bgs (S0101 13 - 15' @ 1205). Samples were collected for analysis of VOCs, semivolatile organic compounds (SVOCs), metals, and polychlorinated biphenyls (PCBs). However, samples collected for PCBs would undergo a screening procedure in a temporary laboratory set up in the Facility's laboratory building prior to submittal to the analytical laboratory (Severn Trent Laboratories) in accordance with the QAPP. All subsequent collected samples will have the same analyses performed.

The field crew followed their QAPP and FSP with the exception of hydrating the granular bentonite poured down the borehole after the probe rods were removed and using disposable plastic syringes and 40 ml glass vials for soil samples collection for volatiles analysis. Mr. Schilling of Roberts Environmental poured spent decontamination fluid (tap water and Liquinox®) from a five-gallon bucket into the hole to hydrate the granular bentonite. Mr. Hiller and Mr. Bunsen were notified of the deviation and immediately told the field crew to hydrate the granular bentonite with clean, tap water. Mr. Jones and Ms. Schwent of URS utilized disposable plastic syringes to collect the soil samples for volatiles analysis which differed from the equipment outlined in the QAPP. Appendix B The QAPP (i.e., Standard Operating Procedure for soil sample collection) specifically calls for the use of EnCore® samplers and not the disposable plastic syringes and 40 ml glass vials. According to Mr. Hiller and Mr. Bunsen, this deviation had been approved by USEPA, prior to implementing this sample collection methodology. Because this method of sample collection is acceptable under USEPA SW-846 Method 5035, Mr. Twigg did not discuss this further as the sampling methodology utilized was still appropriate even though it differed from the QAPP. All subsequent field activities were performed in accordance with the QAPP and FSP with the exception of borings advanced to 16 feet bgs instead of 15 feet bgs as mentioned above.

At approximately 1208 hours, Mr. Twigg departed the Facility for lunch and then travelled to the Illinois EPA (IEPA) office in Collinsville, Illinois, at the request of Mr. Ken Bardo (USEPA) to review the IEPA files for any information on Solid Waste Management Unit (SWMU) 27 (former drum burial site). At approximately 1305, Mr. Twigg arrived at the IEPA office in Collinsville and met with Ms. Gina Search of IEPA to discuss any file material she had regarding SWMU 27 at the Facility. Ms. Search provided the entire file consisting of the following information:

- IEPA request to Facility for cleanup objectives review (6 Oct 1985)
- Letter from Mr. Robert Kuykendall (IEPA) to Mr. Warren Smull (Monsanto) with comments on Monsanto's proposed plans for cleanup of SWMU 27 (13 Nov 1985)
- Various revisions and comments on Monsanto's Health & Safety Plan (1985 - 1986)
- Contract between Monsanto and Rollins Environmental (1985)

- Telephone memoranda and field notes from Mr. Tom Powell (IEPA) regarding drum exhumation (December 1985 - February 1986)
- Various analytical data from Monsanto to IEPA regarding soil samples and discharge of water used for decontamination (1986)

At approximately 1530 hours, Mr. Twigg returned to Lot F at the Facility. The field crew was completing sampling at S0105 (S0105 0 - 2' bgs @ 1520, S0105 4 - 6' bgs @ 1525) and had previously sampled at S0102 (S0102 0 - 2' bgs @ 1250, S0102 4 - 6' bgs @ 1255). A matrix spike/matrix spike duplicate (MS/MSD) was also collected at S0105 zero to two feet bgs. At approximately 1545, the field crew set up and commenced sampling at S0104 (S0104 0 - 2' bgs @ 1635, S0104 14 - 16' bgs @ 1655). The field crew then stored all equipment for the next day's sampling and returned to the Facility offices to complete paperwork (e.g., chain of custody forms, airbills) and ship samples to the laboratory via Federal Express. Mr. Twigg left the site at approximately 1702 hours.

March 12, 2003

On Wednesday, March 12, 2003, at approximately 0730 hours, Mr. Twigg arrived at Lot F. The temperature was approximately 50° Fahrenheit and cloudy. The gate to Lot F was still locked. At approximately 0740, Roberts Environmental personnel arrived. At approximately 0754 hours, Mr. Hiller and Mr. Bunsen arrived to unlock the gate to Lot F. URS personnel arrived at approximately 0903 hours and began setting up at S0103. Mr. Bunsen indicated that URS and Roberts Environmental would bring a second field crew out to the Facility tomorrow. Mr. Twigg observed the collection of the following samples on Wednesday, March 12, 2003:

S0103
S0103
S0106
S0106
S0107
S0107
S0303
S0303
S0302
S0302
S0301
S0301

Mr. Twigg departed the site at approximately 1657 hours for the day as field crew returned to the Facility offices to complete paperwork and ship samples.

March 13, 2003

On Thursday, March 13, 2003, at approximately 0730 hours, Mr. Twigg arrived at Lot F as both

field crews began setting up to sample. The temperature was approximately 40° Fahrenheit and foggy. The second field crew consisted of URS (Mr. Steve Schroff and Ms. Kim Hoskins) and Roberts Environmental (Mr. Joe Brown and Mr. Brian Mudd) personnel. The second field crew used a probe unit made by Roberts Environmental called a Geocat, which is similar to the GeoProbe® unit used by the first field crew. This Geocat probe unit was attached to a Bobcat® 642B. The second field crew utilized the same sampling equipment and methodology as the first field crew. Mr. Twigg observed the collection of the following samples on Thursday, March 13, 2003:

S0108
S0109
S0111
S0110
S0113
S0114
S0203
S0202
S0202
S0207
S0201

Mr. Twigg departed the site at approximately 1635 hours for the day as the field crew returned to the Facility offices to complete paperwork and ship samples.

March 14, 2003

On Friday, March 14, 2003, at approximately 0735 hours, Mr. Twigg arrived at the Facility. The temperature was approximately 38° Fahrenheit and foggy. Mr. Twigg waited in the Facility lobby until Mr. Hiller arrived at 0810 hours. Mr. Hiller discussed the sampling for the day and indicated that the field crews would be sampling in Areas 4 and 11. Mr. Eric Fritsch of URS replaced Mr. Schroff on the second field crew for Friday. Mr. Twigg observed the collection of the following samples on Thursday, March 13, 2003:

S01101
S01102
S01103
S0411
S0402

Mr. Twigg departed the site at approximately 1430 for the day. This completed Mr. Twigg's oversight activities.

March 17, 2003

On Monday, March 17, 2003, at approximately 1230 hours, Booz Allen team member John Belin arrived at the Facility. The temperature was approximately 65 ° F and partly cloudy. Mr. Belin met with Mr. Mark Peel of Solutia and proceeded to the locations where the field crews were sampling. The same members of the field crews that conducted sampling on March 14, 2003, were present. In the morning, prior to Mr. Belin's arrival, the field crews completed sampling at the following soil boring locations:

S0404
S0407
S0408
S0409
S0906
S0907

Upon arrival, Mr. Belin observed the collection of samples at the following boring locations in the afternoon of Monday, March 17, 2003:

S0903 (the first field crew had partially completed this boring when Mr. Belin arrived)
S1001 (the second field crew had almost completed this boring when Mr. Belin arrived)
S0905
S1004

During the drilling of boring S1004, two LEL readings of 59 parts per million (ppm) and 100 ppm were detected in ambient air escaping from the borehole after drilling to a depth of eight feet. Because this reading was only detected at the ground surface and not in the breathing zone, the field crews decided to continue the boring. No other difficulties were encountered and samples were collected accordingly.

During drilling of boring S1003, refusal was encountered at three locations at a depth of six feet bgs. As a result, the field crews ceased drilling at this location until Mr. Hiller could provide information for an alternative sampling location. Therefore, the field crews terminated sampling activities for the day and returned to the sample packaging and shipping location. Mr. Belin observed the sample packaging and shipping activities and did not identify any inconsistencies or deviations in the approved QAPP or FSP.

Mr. Belin departed the site at approximately 1520 for the day as field crews continued to complete paperwork and prepare samples for shipping.

March 18, 2003

On Tuesday, March 18, 2003, at approximately 0739 hours, Mr. Belin arrived at the Facility.

The temperature was approximately 58° F with cloudy skies and light rain. Mr. Belin met with Mr. Hiller and they proceeded to the laboratory/sample packaging area to observe loading of sampling supplies to be used during the day. Ms. Andree Pinnell of URS indicated that the field crews would be using four-ounce glass jars for collecting soil samples for SVOC analysis instead of the standard eight-ounce glass jars. Ms. Pinnell indicated that the laboratory, conducting the analysis of samples, had approved the smaller volume of soil. Mr. Belin and Mr. Hiller proceeded to boring location S1003, where field crews had encountered refusal at the end of the previous days drilling activities. After reviewing some old maps of the area and a lengthy discussion of the potential locations of underground utilities, Mr. Hiller decided that boring S1003 should be moved 12 feet to the northwest to avoid what he thought were subterranean concrete foundations that were likely present from a previous building. No refusal was encountered at the new boring S1003 location.

Mr. Belin observed the boring and sample collection activities at the following boring locations on Tuesday, March 18, 2003:

S1003
S0908
S1001
S1002
S0713
S0712
S0801
S0802
S0803

No significant difficulties were encountered during the drilling or sampling activities that occurred on Tuesday, March 18, 2003. Following the completion of sampling activities at boring S0803, Mr. Belin accompanied the field crews to the sample preparation and shipping location to observe sample packaging activities. Mr. Belin departed the site at approximately 1715 hours for the day as field crews continued to complete paperwork and prepare samples for shipping.

March 19, 2003

On Wednesday, March 19, 2003, at approximately 1100 hours, Mr. Belin arrived at the Facility. Heavy rains had occurred overnight and continued until approximately 1000 hours on March 19, 2003. Upon arrival at the Facility, the temperature was approximately 55° F with cloudy skies and light rain. Mr. Belin met with Mr. Bunsen of URS and proceeded to boring location S0901. The previous day, Mr. Bunsen had indicated that sampling activities would be delayed due to rain. He indicated that he would call Mr. Belin before the field crews began sampling activities after any rain delays. When Mr. Belin arrived at the Facility, Mr. Bunsen indicated that the field crews had arrived earlier in the morning and had already completed several borings. The following borings were completed prior to Mr. Belin's arrival at the Facility:

S0901
S0902
S0904

At approximately 1155 hours, Mr. Ken Bardo and Ms. Bhouma Sundar of US EPA Region 5 arrived at the site. Mr. Belin, Mr. Bardo, Ms. Sundar, Mr. Bunsen, and Mr. Hiller had a meeting to discuss the sampling activities. Following the meeting, all participants conducted a walkthrough of the laboratory/cafeteria building to evaluate the need for indoor air sampling. The group also conducted a walkthrough of the CCB, BBG, BK, and BZ buildings to determine possible indoor air sampling locations.

While Mr. Belin was participating in the walkthrough activities, field crews completed sampling activities at the following boring locations:

S1201
S1202
S1203
S1204

Mr. Belin departed the site at approximately 1615 hours for the day as field crews continued to complete paperwork and prepare samples for shipping.

March 20, 2003

On Thursday, March 20, 2003, at approximately 0740 hours, Mr. Belin arrived at the Facility. The temperature was approximately 50° F with cloudy skies and light rain. Mr. Belin met with Mr. Hiller to discuss the day's sampling activities and then proceeded with the field crews to the boring locations.

Mr. Belin observed the boring and sample collection activities at the following boring locations on Thursday, March 20, 2003:

S0414
S0415
S0416

Field crews were completing the sampling activities at boring location S0416, when Mr. Belin had to depart for the airport. Mr. Belin departed the site for the day at approximately 1140 hours. This was also the completion of Mr. Belin's oversight of the soil sampling activities.

LOG BOOK

PHOTOGRAPHS

John Belin

3/17 - 3/21

Oversight Inspection
of Soil and Air Sampling
at Solutia, Inc.
Sanger, IL.

The paper in this book is
made of 50% high grade rag stock with
a WATER RESISTING surface sizing.

ALRL 3/17/03

3/17/03
1:00pm

Arrived at site. Temp: 65° Partly cloudy.

Met with Mark Peal and proceeded to drilling site.

URS had two crews with Geoprobe units mounted on Bobcats.

We drilled 16 ft. Soil bcore in West portion of Summit 44 area.

Soil core drilled today included

50907	50903
50908	50906
50909	50907
50905	50904

When I moved crews we were working on
50903 and 50905. Borings located in a gravel area, mostly pea gravel
P1 Picrm facing west, shows beginning of
51004 bmg.

3/17/63

3/17/63

Shows cross lying to exposed
cus and underlying geology.

During Aug of 51004 cross directed
W. E. of 51004 on 10' incline at 100 yds. to
2nd level. After discussion with some land
at 100 yds. level, decided to examine drilling

Second cross began drilling 51003 over
energy plant. Report of probe around
at 6' and also seen two small 51004
near 100 yds. level. Shows provided information on
to determine location of drilling

Shows Shows going of base below
sample cross have been called. Also were
filled with a mixture of concrete and H₂O.

Shows Shows cross during table for
curve.

Shows Shows of down from above

Shows Shows of cross had finished location on
marked of 51004

SLR 3/17/03

SLR 3/17/03

Pg

Shows IDW dms on back of

N/A

Trailer at S1003

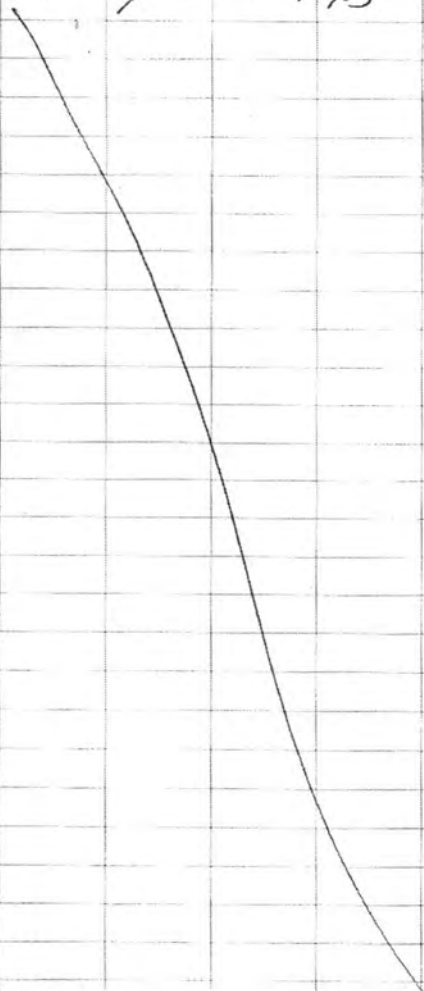
Because of refusal at S1003 and
because excavation permits did not
allow drilling at ²⁰ ~~20~~ location
Crews decided to terminate drilling &
dig at 3pm.

Hauled back to lab & observe sample
packing and shipping to off-site lab.

Crews noticed some strong Tan-like odors
from some samples. Decided to pack
samples outside to avoid exposure.

Left site at 3:20pm & day.

4/18/03 3/17/03



4/18/03 3/18/03

Temp: 58, Cloudy, light rain

3/18/03

7:39am

Arrived at Site. Met Bob Miller and went to lab to observe loading of sample jars/bottles for morning sampling.

Andre indicated that 4oz jars were going to be used for SVOC samples of soil. Apparently she got directions from Lab.

Went to SDOB to discuss where to relocate the latrine that got closed. After looking at some old maps that Bob had, it was decided that the latrine should be moved ~12ft to NW to avoid some concrete foundations that were likely present from previous buildings. Drilling of new latrine began at 9am.

SO908, Boring went smoothly. Reached 16' depth with no problems. Some low PID readings observed. Hole filled and crew ready to move to next boring.

JPL RL: 3/16/83

JPL RL: 3/16/83

S0908, because boring had no visible staining and PID readings were all low, decision needed to be made to determine when to take sample. Decided to take sample from native soils or area where highest PID area was located. This was approximately 5-6 ft deep.

S1003, PID reading at 5'-7" were 66 and at 12'-15" were 99. So decided to take 2 samples - one at each level. Clean fill was located in middle with low PID.

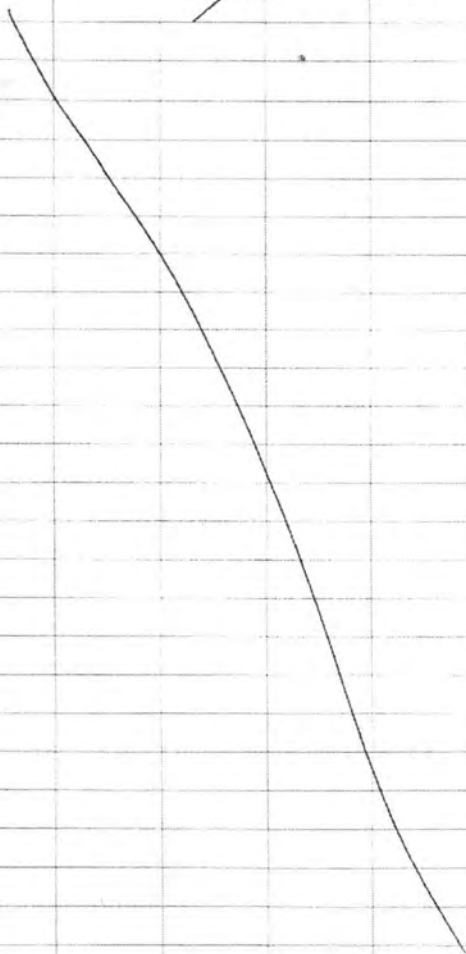
Next two borings are S1001 and S1002 located west of storage plot. S1002 is located closer to trench and S1001 is nearer to CI tank cans.

PW
E Picture of S1002 on setup time before boring had commenced.

Gravel is covered in a thin layer of pea gravel

There is some concern in this area because a natural gas line is buried in the

ALB 3/18/03



ALB 3/18/03

area on the west side of the energy plant. Bring locations are offset to avoid line.

P12
m/a

Decom buckets were out of order. Rain bucket was second bucket. Before I could point it out, it was corrected by crew.

Some dark staining was observed on this boring at approximately 3-4 ft.

S1002, began boring after 8 ft had been completed at S1001, without problems.

Stained soils with an oily sheen observed at 4' depth. PID readings were 0.

Extension rods are not decontaminated before being placed in different borings. Need to check to see.

Visible staining and high PID readings so will sample at 3-5' depth

Break for lunch 12:00; Resume 1:00pm

SLR 3/18/63

Page 101
P13
P14
P15

1.15
3445

Moved to new boring location SO713
located west of 500' adjacent
to a concrete retaining wall.
Ground level is 2-3' above of 2-3' ground
Sampling table set up up of boring
Boring contained very small amount of
soil mostly gravel
SO712 - 1st attempt failed
5' cut; next approximately 5' with
to make 2nd attempt. Perched
upward at 3.5' 3rd attempt was
made 5' with 1st attempt hole.
3rd attempt No return was encountered
Same position like other observed
12-16 ft section.
SO801, located South of CCB building
in front of fair-trust buy storage
approximately 100 ft

ALR: 3/16/03

ALR: 3/16/03

Refusal encountered at 5 ft. Decided to attempt to break through. Successful breakthrough with boring continued. Yellowish clay layer encountered at 5-6' sample collected. Also from 14-16' b/c of PID change

P16

5

50802, located just west of Airport space entry training tank. Near railroad tracks. Ground was covered with several inches of 1-2 inch gravel

Sweet, non-propane like odor noticed upon removal of 8-12 ft rod. Possibly chlorobenzene

Concern about field calibration of PID and other instruments.

Crew used a dräger tube to help identify odor. No benzene present. Test were negative

Decided to collect a duplicate sample from this location

P17

N/A

Picture of sample collection process area at 50801.

418L 3/18/03

P18

E

50803, located East of CCB building
approx 100 ft from CCB building. Near

roadway tracks and track on S. side
area. Ground is covered in gravel
mixture of "gravel".
No problems.

After drilling complete at 50803 went
to lab to observe sample packaging area.

Left facility for the day at 5:15 pm

3/19/03

Arrived at facility at 11 am. After delays due
to rain. Heavy rains all night.
Temp: 55° cloudy, scattered showers

Crews did boring 50901, 50902, 50904
before I arrived. Apparently, they continued
working in rain and did not call
me.

According to Steve Hanson said that
50901 had a significant clay layer but
no problems.

JL Bl 3/19/03

JL Bl 3/19/03

Walked through lab/cantina/labor room
area to see areas need for air sampling.
lots of rooms for exposure. Use PID to
determine best location.

CLB building → looked around to see
breakroom/offices. looks like the best place
to sample.



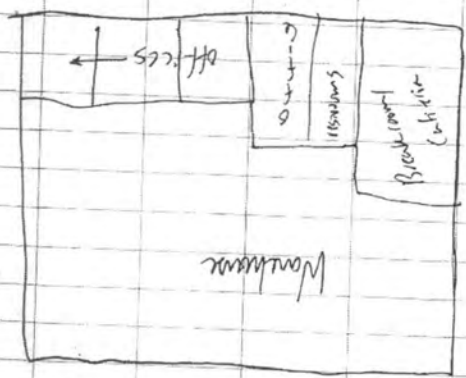
File office appears to be best sampling
location based on description of use. Use PID
to determine location.

File fighters hang out in office most of time
when on shift. Has a wall unit for ventilation.
Small office that is usually kept closed.

Next went to BSG building. Warehouse building.

At RL 3/15/03

At RL 3/15/03



Generally occupied with more in warehouse
 lot of office. One of offices
 seems like a good choice. We PID
 determine best location.
 Next went to BL building. In basement
 the distribution dept. is only occupied
 office. They are in NW corner of building
 decided that this office was best
 location for samples. When decided
 then we should sample directly
 above basement sample (in line) so
 we can observe the gradient. Should
 be secured with PID to find best
 location to set up summer canvas.

Ad. 1st 3/19/03

Ad. 1st 3/19/03

Left site for day at 4:15 pm

3/20/03 Arrived at site at 7:40. Signed in and called Bob Hill.

Weather is 50°, mostly cloudy, with scattered showers.

Supposed a man with soil vapor sampling equipment this morning.

Proceed with clues to S0415 and S0416

S0416 is located adjacent to railroad tracks just north of B&B building. Approx. 6 ft from tracks. Ground is covered with 1" gravel.

S0415 is located north of B&B building adjacent to asphalt parking lot. Ground is covered with crushed gravel.

1st attempt encountered refusal at 5' after hitting concrete. 2nd attempt went 6' South towards B&B building.

Composite sample mixed in stream gravel and wing ground bed

AL 186 3/20/03
 Moved to SD415 located SW of RBE
 Mills. Good view with "ground
 up" site at 11:40 am 3/20/03

AL 186 3/20/03

①

David J. Twigg

11 March 2003 - Tuesday

David Twigg arrives @ Solution in Saugat, Illinois. Reviewing route to the hospital. Weather = 28°F, sunny, light winds. Expected to have a high of 54°F today with partly cloudy skies.

Enter site. Met at gate by guard who sent me to the lobby where I signed in with the guard and watched the safety video. Told guard and lobby attendant that I was here to see Bob Hiller at Solution and that he was expecting me. Safety video indicated that cameras and contact lenses were not allowed in the plant.

Completed safety video and filled out safety briefing sheet. Guard in lobby has paged Bob Hiller twice but he hasn't answered his pager. I met in lobby by Bob Hiller (Solution) and Steve Bensen (URS). Bob indicated that the first geoprobe will be on-site later today and may not start until tomorrow. Area 10 sampling site will likely change a bit due to a lease agreement with Gateway Energy. Bob & Steve provided an overview of past & present activities at the facility, surrounding properties, the investigation plans for this week.

Solution will be working in Lot F for the next few days. Bob Hiller drove us over to Lot F to recon the area. Lot F has at least 6 dogs (wild, feral) so I'll get some pepper spray at Wal-Mart over lunch and call Steve Woffe about this issue. I'll also call John Belin to recommend a 4x4 for next week.

⑦
-05-

David J. Twigg

11 March 2003 - Tuesday

Bob Miller showed me Lot F and the proposed geoprobe locations. Conducted another safety meeting in the field with OFCS geologists and their geoprobeing subcontractor.

RS setting up at 50101. Probed to 16' bgs, found no evidence of contamination. Collected samples from 0-2' bgs and 15' bgs. Subcontractor used down water to hydrate the bentonite poured down the probe hole. I notified Bob Miller of this and he told OFCS not to let that happen again.

Left site for lunch and go to Collinsville to review F11. EPA files on SWMU 27.

Arrive at Illinois EPA to review file material. File material provided by Gina Search at Ill EPA:

1. COC 1986 Ill EPA request for cleanup objectives review
2. 13 Nov 1985 Letter from Robert G. Kuykendall (IEPA) to Warren L. Small (Monsanto) with comments on Monsanto's proposed plans for cleanup of SWMU 27.
3. Various revisions and comments on Monsanto's HRS Plan
4. Contract between Monsanto and Rollins Environmental.
5. Telephone memos and field notes from IEPA personnel. (Tom Powell)
Specifically, field notes on drum exhaustion Dec 1985 - Jan 1986 - Feb 1986
6. Various data w/ discharge of down water, soil samples, etc.

(3)

11 March 2003 - Tuesday

11 T. Wigg

Essentially the field notes in the IEPA files indicate that the main trench was rectangular in shape across RR tracks. Near the south end of Lot F. However, the exact location of this area within Lot F is unknown based on the file material reviewed at IEPA. Need photocopies of file material from Tina Savch & IEPA.

Back to solution to check in, 5 gpm.

Back to Lot F. Crew at 0105. Fine gr. sample collection Geopliers (Robert's Environmental Drilling), Mill Street, IL setting up at 50104.

Geopliers: set up at 50104 - Photo 1, facing South.

Photo 2 - 50104, facing East. Geopliers standing hole.

Photo 3 - screen prior bit

Photo 4 - Decon micro core sampler. Geopliers using acetone

gloves for sample/core collection.

Photo 5 - example of geologist using soil core at 50104

Photo 6 - example of VR's geologist laying soil core at 50104

VR's field crew = George Jones, Jennifer Richmond

VR's and Robert's will no longer come today. Robert's heading over

to the plant to drop off IDed VR's sampling soil and then heading

back to plant for sample management.

102. Leave site for the day.

Photo 7

(4)

... J Twigg

12 March 2003 - Wednesday

Twigg arrives at Siluria Facility. Gate to lot F not open yet and URS crew not at site. Weather = 48°F, light south wind, sunny (partly)

URS personnel opens gate to lot F. Geoprobeers begin setting up for the next hole. URS still not on site. IT rained quite a bit last night and lot F is quite wet.

URS crew arrives. Setting up at 50103

Samples observed

50103 0-2' bgs

50103 14-16' bgs

50106 0-2' bgs (also ms/msd)

Break for lunch

50106 8-10' bgs

50107 0-2' bgs

50107 14-16' bgs

50303 0-2' bgs

50303 14-16' bgs

50302 0-2' bgs

50302 14-16' bgs

50301 0-2' bgs

50301 14-16' bgs - duplicate also collected at this location

Field crew finished sampling for the day.

(3)

12 March 2003 - Wednesday

... site for the day. All field work performed in
... stance with work plan except they didn't use encore.
... instead, they used plastic disposable syringes and 40 ml
... vials. They did this yesterday as well but I just
... the work plan this morning.

Don't

(6)

13 March 2003 Thursday
 J. Twigg
 and Twigg arrived at station facility. Both field crews are to start setting up in lot 10 field crews as follows:

Crew #1: URS - George Jones, Jennifer Schewert

Roberts - Jim Rowden, Brian Seilling
 - Geoprobe GH-40
 - Robert 253

Crew #2: URS - Steve Schmitt, Kim Harkins

Roberts - Joe Brown, Brian Mudd
 - Geoprobe GH-40
 - Robert 253

I will plan on burning back and forth between crews today but will likely spend more time with crew #2 since I've already watched crew #1.

Home-made unit, very effective!

For 1 1/2 days.

Sample collection observed:

50108 0-2' bgs (ms/mud also)

50108 2-9' bgs

50109 0-2' bgs

50109 14-16' bgs

50111 0-2' bgs

50111 14-16' bgs

50110 0-2' bgs

50113 0-2' bgs

50113 14-16' bgs (dup/with also)

1200 break for lunch

Twigg

13 March 2003 - Thursday

Sample Collection observed (continued)

0-2' bgs

14-16' bgs

0-2' bgs

14-16' bgs

0-2' bgs

14-16' bgs

0-2' bgs (also collected equipment blank here after

Robert's personnel decontaminated non-dedicated sampling eq., which
only included the probe rod bit.) Photos 11, 12

14-16' bgs

0-2' bgs (another eq. blank)

14-16' bgs

Depart site for the day. Again, all work performed in
accordance with work plan (WAPP & FSP)

Twigg

(8)

14 March 2003 - Friday

... arrives at facility. Weather = 40°F, cloudy, foggy, NE breeze.
... the weather info for yesterday, which was in the 30s with
... and a N wind ~15-25. Very cold and bitter day.
... arrived. He indicated that the field crews would be
... in areas 4, 11 today.

... Crew #2, Eric Fritsch replaced Steve Schrott today.

Sample collection observed

501101 10-12' bgs (Photo 13, 14)

50152 14-16' bgs

50403 14-16' bgs

50411 14-16' bgs

Break for lunch

50402 14-16' bgs

Leave site to head back to KC. Again, all work
performed in accordance with QAPP, RSP.

1207



Photo Number: 01
Photographer: David Twigg
Direction: South
Date: 11 March 2003
Time: 1559
Description: Field crew setting up to probe at S0104



Photo Number: 02
Photographer: David Twigg
Direction: East
Date: 11 March 2003
Time: 1604
Description: Roberts Environmental personnel beginning to probe at S0104



Photo Number: 03
Photographer: David Twigg
Direction: Not applicable
Date: 11 March 2003
Time: 1605
Description: Roberts Environmental personnel decontaminating probe bit



Photo Number: 04
Photographer: David Twigg
Direction: Not applicable
Date: 11 March 2003
Time: 1 605
Description: Roberts Environmental personnel decontaminating Macrocore sampler



Photo Number:	05
Photographer:	David Twigg
Direction:	Not applicable
Date:	11 March 2003
Time:	1616
Description:	URS personnel logging soil core at S0104



Photo Number: 06

Photographer: David Twigg

Direction: Not applicable

Date: 11 March 2003

Time: 1616

Description: URS personnel logging soil core at S0104



Photo Number: 07
Photographer: David Twigg
Direction: Northwest
Date: 13 March 2003
Time: 1432
Description: Field crew probing at S0203



Photo Number: 08
Photographer: David Twigg
Direction: Not applicable
Date: 13 March 2003
Time: 1433
Description: Roberts Environmental personnel decontaminating probe bit



Photo Number: 09

Photographer: David Twigg

Direction: Northwest

Date: 13 March 2003

Time: 1433

Description: Field crew probing and logging soil core at S0203



Photo Number: 10

Photographer: David Twigg

Direction: Not applicable

Date: 13 March 2003

Time: 1435

Description: URS personnel homogenizing soil sample at S0203



Photo Number: 11
Photographer: David Twigg
Direction: Northwest
Date: 13 March 2003
Time: 1545
Description: URS personnel collecting equipment rinsate blank sample



Photo Number: 12
Photographer: David Twigg
Direction: Northwest
Date: 13 March 2003
Time: 1547
Description: URS personnel collecting equipment rinsate blank sample



Photo Number: 13
Photographer: David Twigg
Direction: Northeast
Date: 14 March 2003
Time: 0900
Description: Field crew probing at S1101



Photo Number: 14
Photographer: David Twigg
Direction: East
Date: 14 March 2003
Time: 0901
Description: Field crew probing at S1101



Photo Number: 15
Photographer: John Belin
Direction: East
Date: 17 March 2003
Description: Field crew checking volatile emissions from bore hole at boring S1004



Photo Number: 16
Photographer: John Belin
Direction: Not applicable
Date: 17 March 2003
Description: Field crew evaluating geology on 1 to 4 foot core taken from boring S1004



Photo Number: 17
Photographer: John Belin
Direction: Not applicable
Date: 17 March 2003
Description: Investigation derived waste drums for soil and groundwater



Photo Number: 18
Photographer: John Belin
Direction: Not applicable
Date: 18 March 2003
Description: Field crew collecting soil samples from boring S0801



Photo Number: 19
Photographer: John Belin
Direction: West
Date: 19 March 2003
Description: Field crew probing at S0803



Photo Number: 20
Photographer: John Belin
Direction: West
Date: 17 March 2003
Description: Soil boring location S1004 after completion of field activities

SOLUTIA - 111



KEN BARDO
<kbardo@prodigy.net>

To: Nabil Fayoumi cc: Kenneth Bardo
Subject: Slurry Wall Comments

05/02/03 09:52 AM

Attached are my written comments of the report we discussed yesterday. Good luck! - Ken



Solutia Slurry Wall Construction Comm



May 2, 2003
Ken Bardo

Comments on Solutia "Implementation of Slurry Wall Construction"
Dated April 24, 2003

1. The installation of a barrier wall by slurry or jet grouting is secondary to the most important component of the groundwater remedy; the installation of three extraction wells and pumping of contaminated groundwater before it can discharge to the Mississippi River. The barrier wall is intended to reduce the amount of groundwater that will need to be pumped in the long-term by cutting off the flow of river water to the extraction wells. Therefore, the installation and pumping of extraction wells must proceed and be completed in accordance with the time frame provided for in the CERCLA AO (i.e., 8 months from the effective date of the AO).
2. Slurry walls are typically constructed to achieve a hydraulic conductivity of 10^{-7} cm/sec using bentonite and in some cases cement, mixed with the natural soils. The report does not include any specificity regarding the construction of the slurry wall. For example, using a performance standard for hydraulic conductivity of 10^{-7} cm/sec, the percentage of bentonite and cement, if necessary, to be mixed with the on-site sands needs to be determined. Various mixtures of the on-site sandy soils, bentonite, and cement should be prepared and laboratory permeabilities calculated. The appropriate soil-bentonite (and cement) mixture to achieve the performance standard for hydraulic conductivity should be approved by EPA before the slurry wall is installed.
3. The construction of a slurry wall with a hydraulic conductivity of 10^{-7} cm/sec will enable Solutia to significantly cut-off the migration of river water to the extraction wells and maintain an inward gradient. Solutia proposes a zero gradient across the wall which is inconsistent with similar remedies. Rather than a zero gradient, an inward gradient (across the wall) of at least one-foot is a typical operational performance standard for a slurry wall. For example, the CECOS RCRA Corrective Action Consent Order requires the groundwater extraction system to "be designed, constructed, operated and maintained to assure and maintain a hydraulic gradient toward the interior of the slurry wall, with a minimum of a one (1) foot gradient differential across the slurry wall."
4. Historical data for the Mississippi River for the year 2002 shows that river stage can fluctuate significantly during a single day, dropping as much as 2-feet and rising as much as 5-feet. These significant fluctuations and their impacts on groundwater levels complicate the ability of Solutia to maintain a zero gradient across the slurry wall. If there is a rapid response of groundwater levels to river stage, pumping rates at the extraction wells may need to be adjusted on a frequent basis. With the installation of a slurry wall, it may be more prudent and appropriate to maintain a

significant inward gradient toward the interior of the slurry wall in order to maintain a more consistent pumping rate and discharge to the American Bottoms POTW. The ability to maintain a zero gradient seems problematical given the significant daily and seasonal fluctuations of the Mississippi River stage.

SOLUTIA - 112

May 2, 2003

DE-9J

VIA E-MAIL AND CERTIFIED MAIL
RETURN RECEIPT REQUESTED

7099 3400 0000 9586 1388

Mr. Robert Hiller
Solutia Inc.
500 Monsanto Avenue
Sauget, IL 62206-1198

RE: Approval of Cost Estimate
Solutia Inc.
ILD 000 802 702

Dear Mr. Hiller:

In a letter dated February 4, 2003, we required Solutia to submit a revised cost estimate to complete corrective action activities, pursuant to Section XVI of the Administrative Order on Consent (AOC), EPA Docket No. R8H-5-00-003. The activities to be included in the cost estimate are soil and air investigations, determination of the extent of groundwater contamination, the consideration and use of physical barriers to control human exposures, environmental indicator reports, human health risk assessments, and determination of the final corrective measures.

The revised cost estimate provided by you on April 23, 2003 is approved with the following condition:

- The April 23, 2003 letter did not provide any costs for completing the necessary investigations to determine the extent of groundwater contamination as required by the AOC. Figure 18 of the Description of Current Conditions (DOCC) report proposed three north-south transects for sampling and two north-south transects for water levels. The specific groundwater sampling plan is provided in Section 6.3 of the DOCC.

We understand from Mr. Richard Williams that some comparable work may have been performed during the CERCLA RI/FS for the Sauget Area 2 Sites. Any outstanding groundwater investigations necessary to complete the work required by the AOC, as proposed in the DOCC must be considered and cost estimates provided for, in addition to the current cost estimate of \$1,117,000 for RCRA Corrective Action.

Within 30 days of this letter (June 2, 2003), Solutia must establish and maintain financial security in the amount of \$1,117,000 (plus the estimated costs to complete the determination of the extent of groundwater contamination), in one of the forms permitted under 40 C.F.R. § 264.145 (modified to replace the terms "post-closure" and "closure" with "corrective action" and referencing the Consent Order, as approved by U.S. EPA).

If you have any questions, I can be reached at (312) 886-7566 or at bardo.kenneth@epa.gov.

Sincerely yours,

Kenneth S. Bardo

Kenneth S. Bardo
EPA Project Manager
Corrective Action Section

cc: Richard Williams, Solutia (e-mail only)
Jim Moore, IEPA
Gina Search, IEPA

bcc: Nabil Fayoumi, Superfund
Rich Murawski, ORC
George Hamper, ECAB

DE-9J:KBARDO:5/2/03:kb:6-7566 Solutia Cost Estimate Approval

OFFICIAL FILE COPY

SENDER: COMPLETE		U.S. Postal Service CERTIFIED MAIL RECEIPT (Domestic Mail Only; No Insurance Coverage Provided)	
<ul style="list-style-type: none">Complete items 1, 2, 3, and 4 if RestrictedPrint your name and address so that we can return it to you if delivery is refused or on the front if space permits		Article Sent To: <i>K. Bardo, DE-9J</i>	
1. Article Addressed to: <i>Robert Solutia 500 Mont Sauget,</i>		Postage \$ <i>.37</i> Certified Fee <i>2.30</i> Return Receipt Fee (Endorsement Required) <i>1.75</i> Restricted Delivery Fee (Endorsement Required) Total Postage & Fees \$ <i>4.42</i>	
2. Article Number (Transfer from service)		Name (Please Print Clearly) (to be completed by mailer) <i>Bob Miller</i> Street, Apt. No., or PO Box No. <i>500 Monsanto Ave.</i> City, State, ZIP+4 <i>Sauget, IL 62206-1198</i>	
PS Form 3811, August 2001		PS Form 3800, July 1999 See Reverse for Instructions	
		Domestic Return Receipt	
		2ACPRI-03-Z-0985	

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Date of Delivery *7/6/03*
☐ Yes
☐ No
or Merchandise
☐ Yes

SOLUTIA - 113

Kenneth
Bardo/R5/USEPA/US
05/29/2003 03:30 PM

To rjhill1@solutia.com, rswill1@solutia.com
cc
bcc

Subject File review of Route 3 Drum Site

Bob and Richard - Attached are highlights of information we found in IEPA files regarding the 1985-1986 clean up of the Route 3 drum site.



Solutia Route 3 File Review.w

This information raises the following questions/concerns regarding site investigations and achieving the CA 725 environmental indicator.

- The Region 9 PRG for the direct contact exposure pathway for industrial soil is 4.5 ppm for *o*-chloronitrobenzene and 37 ppm for *p*-chloronitrobenzene. No PRG is provided for nitrobiphenyl. A risk number will need to be developed for nitrobiphenyl.
- A 2-nitrobiphenyl concentration of 210 ppb was identified in groundwater sampling performed at well GM-31A in January 2000. Well GM-31A is located at the west edge of the trench.
- What was the total mass of waste and contaminated soil removed from the trench and sent off-site before it was capped?
- Was there any additional excavation and removal after January 1986?
- What were the results of the core sampling performed to characterize the trench?
- Was there surface soil sampling performed in the area of the trench after the 1985-1986 cleanup?
- The Route 3 drum site area should also be investigated for PCBs.
- What is the thickness of the cap and what is the source of the cap material?
- Are there sufficient monitoring wells to assess the release of contaminants from the trench?
- Ensure that testing of soil and groundwater in the Route 3 drum site area includes all the various chloronitrobenzene and nitrobiphenyl compounds.

May 29, 2003

IEPA File Review of Solutia Route 3 Drum Site

- Approximately 4500 drums of nitrochlorobenzene and 500 drums of nitrobiphenyl disposed in 40' x 248' x 20' trench in 1946.
- 12/9/85 - Voluntary cleanup to start.
- Railroad tracks built over trench had to be removed.
- 12/18/85 - Two drums removed.
- 12/19/85 - Seven samples taken of yellow/off-white granular material. Found 4-nitrobiphenyl and nitrochlorobenzene.
- Drums in very bad condition.
- 1/3/86 - Filling fiber drums with waste and contaminated soil.
- 1/6/86 - Waste piles located east of trench.
- 1/13/86 - Four semi-trailers of fiber drums have left the site for incineration. Total of 750? fiber packs.
- 1/14/86 - Six trailers ready to go. Processing pad had three more truckloads.
- 1/23/86 - Fiber packing three times more soil than expected. Loading two trailers per day. No activity since 1/15/86 because incinerator can only handle 6 semi-trailers per week. West edge of trench is clean. Trench is approximately 35' shorter than originally thought.
- 2/10/86 - Soil analysis report showed mainly DCNB, DNCB, 2 NBP, and 4 NBP present. PCBs also present at 2 to 25 ppm.
- 2/28/86 - Closing the site down. Stopped shipping because of overloading incinerator and possible PCB contamination. Reconsidering options because of amount of contaminated material being excavated.
- 4/1/86 - Conduct core sampling to characterize the trench and determine how to dispose, how to handle, how to excavate, and clean up.

SOLUTIA - 114



"Hiller, Robert J"
<rjh11@solutia.com>

06/13/03 10:35 AM

To: Kenneth Bardo
Subject: File review of Route 3 Drum Site

Ken,

Sorry it has taken so long to respond to your e-mail concerning the Route 3 Drum Site.

I have located a number of files from the Rt. 3 Drumsite Project. I am in the process of reviewing the files to determine if

any of the information will help me to answer your questions.

I believe that some of the data will be useful.

As soon as the review is complete, I will send you my response.

If you have any further questions concerning the Route # Drumsite, please do not hesitate to ask.

Thanks

Hiller